

**UNITED STATES PATENT APPLICATION**

**OF**

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**FOR**

**WASHING MACHINE**

[0001] This application claims the benefit of Korean Application(s) No. 10-2002-0074965 filed on November 28, 2002, which is/are hereby incorporated by reference.

## BACKGROUND OF THE INVENTION

### 5 Field of the Invention

[0002] The present invention relates to a washing machine, and more particularly, to a washing machine having a packing means for preventing water from flowing in a cabinet by cutting off a gap between a detergent storing assembly and the cabinet having an installation hole where the detergent storing assembly is loaded.

### 10 Discussion of the Related Art

[0003] Generally, water and detergent are held in a tub of a drum type washing machine and a laundry is put in a drum inside the tub. The drum is then rotated to perform washing, rinsing, and dewatering.

[0004] The general drum type washing machine consists of a tub having an open  
15 front side to hold water and detergent, a drum rotatably provided in the tub to hold laundry, a motor rotating the drum, a cabinet holding the tub and the motor inside, and a detergent box in the cabinet to provide the detergent to the tub.

[0005] A user has difficulty in putting an appropriate amount of detergent in the drum directly. Moreover, if the detergent is directly put in the drum, color of the laundry may be  
20 changeable. Hence, the detergent storing assembly is separately installed in an upper part of the cabinet to allow the detergent to flow in the tub together with the supplied water.

[0006] Referring to FIG. 1, the detergent storing assembly consists of a detergent box 18 holding a detergent to provide to a tub in washing, a lid frame 22 fixed to an upper rim of the detergent box 18 to have an opening at a center for inputting the detergent, and a lid 24

hinge-coupled to the lid frame 22 to open/close a topside of the detergent box 18.

[0007] The detergent box 18 is installed at a top plate 13, on which a control panel 13a for controlling a washing machine is installed, forming a topside of a cabinet of the washing machine and has a plurality of detergent storing parts 18a, 18b, and 18c to separately  
5 store detergent powder, fiber softener, and bleaching agent.

[0008] Specifically, the detergent box 18 is installed in a loading hole 13b formed at the top plate. For this, the detergent box has hooks 18d and 18f formed at front and rear ends. And, hook holes 13c and 13d are formed on an inner wall of the loading holes 13b to correspond to the hooks.

10 [0009] The lid frame 22 connected to the lid 24 is fixed to the above-constructed detergent box.

[0010] The lid frame 22 is assembled to the detergent box 18 in a following manner. First of all, fitting protrusions 19 protruding upward from both upper sides of the front and rear ends of the detergent box are fitted to coupling protrusions 23 protruding downward from  
15 a bottom of the lid frame 22, respectively. And, the lid frame 22 is then fixed to the detergent box 18 using screws S.

[0011] The lid frame 22 assembled to the detergent box 18 is loaded on the rim of the loading hole 13b at the top plate.

[0012] However, in the above-constructed detergent storing assembly, water outside  
20 the cabinet flows in a gap between the top plate and the lid frame, whereby various internal parts of the drum type washing machine are damaged.

[0013] To overcome such a problem, development of a washing machine having a waterproof structure enabling to prevent the water from flowing in the gap between the lid frame and the top plate is needed.

## SUMMARY OF THE INVENTION

[0014] Accordingly, the present invention is directed to a washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0015] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a washing machine, by which a packing means for preventing water from flowing in a cabinet via a loading hole where a detergent storing assembly is loaded.

[0016] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0017] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a washing machine including a tub holding laundry, water, and detergent, a detergent storing assembly storing the detergent and providing the detergent to the tub on washing, a cabinet having the tub installed inside wherein the detergent storing assembly is loaded on a loading hole formed at one side of the cabinet, and a packing means sealing a gap between the detergent storing assembly and the cabinet to prevent external water from flowing in the cabinet.

[0018] The detergent storing assembly includes a detergent box provided to the loading hole to store the detergent and a lid part fixed to a topside of the detergent box to

open/close.

[0019] The lid part includes a lid frame fixed to the detergent box and having an opening at a center to put the detergent in the detergent box and a revolvable lid installed at one side of the lid frame to open/close the topside of the detergent box.

5 [0020] A bottom of the lid frame is mounted on a periphery of the loading hole.

[0021] The packing means is provided between the bottom of the lead frame and the rim of the loading hole.

[0022] The lid frame includes an insertion groove to which the packing means is fitted.

10 [0023] The insertion groove is formed at the bottom of the lead frame except a portion to which the lid is connected.

[0024] The packing means includes a gasket fitted to the insertion groove, the gasket partially protruding therefrom.

15 [0025] And, the gasket includes a first gasket inserted in a front portion of the insertion groove of the lid frame and a second gasket inserted in a rear portion of the insertion groove of the lid frame.

[0026] Meanwhile, a plurality of inclined protrusions are formed on an inside of the insertion groove to have the packing means slide to be inserted thereon.

[0027] And, the loading hole is formed at a topside of the cabinet.

20 [0028] Therefore, the packing means prevents the external water from flowing in the cabinet via the loading hole.

[0029] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0030] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

[0031] FIG. 1 is a perspective view of a disassembled detergent storing assembly provided to a cabinet of a general washing machine;

[0032] FIG. 2 is a perspective view of a washing machine according to the present invention;

[0033] FIG. 3 is a cross-sectional view of a washing machine according to the present invention;

[0034] FIG. 4 is a perspective view of a detergent storing assembly and a packing means of a washing machine according to the present invention; and

[0035] FIG. 5 is a perspective view of a lid frame and a packing means a washing machine according to the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0036] Reference will now be made in detail to the preferred embodiment(s) of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0037] FIG. 2 is a perspective view of a washing machine according to the present invention, FIG. 3 is a cross-sectional view of a washing machine according to the present

invention, FIG. 4 is a perspective view of a detergent storing assembly and a packing means of a washing machine according to the present invention, and FIG. 5 is a perspective view of a lid frame and a packing means a washing machine according to the present invention.

[0038] Referring to FIG. 2, a washing machine includes a cabinet 100 forming an exterior, an outer tub 300 provided inside the cabinet 100 to hold water and detergent, an inner tub 400 rotatably installed inside the outer tub 300 to hold laundry, and a motor 500 provided in rear of the outer tub 300 to rotate the drum 400.

[0039] A plurality of lifters 410 are installed on an inner circumference of the inner tub 400 to lift the laundry to a predetermined height when the drum 400 rotates.

[0040] The inner tub 400 holds the laundry, water, and detergent and constructs a washing tub together with the outer tub 300.

[0041] The cabinet 100 includes a cabinet body 110 having an open top and an open front side, a cabinet cover 120 coupled to the front side of the cabinet body 110 and having an entrance h via which the laundry is put in the drum 400, and a top plate 130 coupled to the open top of the cabinet body 110. And, a door 121 is installed at the cabinet cover 120 to open/close the entrance h.

[0042] A control panel 131, in which electronic parts for controlling an operation of the washing machine are installed, is installed on a rear part of the top plate 130.

[0043] And, a detergent storing assembly 200, which stores detergent inside so that water supplied via an inlet hose 140 flows in the outer tub 300 together with the detergent, is installed in a loading hole 132 formed rectangular in one side of the top plate 130.

[0044] Referring to FIG. 4 and FIG. 5, the detergent storing assembly 200 includes a detergent box 210 having an open topside and partitioned into a plurality of detergent storing parts 211a, 211b, and 211c to separately store detergent powder, fiber softener, and bleaching

agent and a lid part 220 coupled to the open topside of the detergent box 210 to open/close.

[0045] The lid part 220 includes a rectangular lid frame 221, of which size is greater than that of the loading hole 132, having an opening 221 long enough to let the various detergents put in the detergent storing parts 211a, 211b, and 211c and a lid 222 hinge-coupled  
5 to the lid frame 221.

[0046] The detergent box 210 is installed to be connected to the inlet hose 140 and supplies the detergent to the outer tub 300 via an inlet bellows 160 installed over the outer tub 300.

[0047] And, the detergent box 210 has hooks 212a and 212b formed at front and rear  
10 ends to be assembled to the loading hole 132. And, hook holes 132a and 132b are formed on an inner wall of a rim of the loading hole 132 to correspond to the hooks 212a and 212b.

[0048] And, the lid frame 221 is assembled to the topside of the detergent box 210 by screws S.

[0049] For this, the lid frame 221 includes coupling protrusions 223a and 223b  
15 protruding from a bottom toward the detergent box 210 to have cavities in an axial direction, respectively. And, the detergent box 210 includes insertion protrusions 213a and 213b protruding from a top of a rim to be inserted in the cavities of the coupling protrusions 223a and 23b and having screw threads inside to be coupled to the screws S, respectively.

[0050] Thus, the lid frame 221 assembled to the detergent box 210 is mounted on the  
20 rim of the loading hole 132 at the top plate.

[0051] The washing machine according to the present invention further includes a packing means 250 for sealing a gap between the detergent storing assembly 200 and the cabinet 100, especially the top plate 130, to prevent water from flowing in the cabinet.

[0052] The packing means 250 is provided between a bottom of the lid frame 221 and



the rim of the loading hole 132 of the cabinet.

[0053] For this, an insertion groove 224, to which the packing means 250 is fitted, is formed at the lid frame 221. In this case, the insertion groove 224 is formed at the entire bottom surface of the lid frame 221 except portions where the lid 222 is coupled.

5 [0054] And, the packing means 250 is a gasket fitted to the insertion groove 224 to protrude partially.

[0055] The gasket includes a first gasket 251 inserted in the front end side insertion groove of the lid frame and a second gasket 252 inserted in the rear end side insertion groove of the lid frame.

10 [0056] The insertion groove 224 includes a plurality of incline protrusions 224a formed on an inside of the groove to reinforce rigidity and to have the first and second gaskets 251 and 252 slide therein to be loaded.

[0057] A process of assembling the gasket 251 and 252 and the detergent storing assembly 200 to the washing machine cabinet is explained as follows.

15 [0058] First of all, the hooks 212a and 212b are coupled to the hook holes 132a and 132b on the inner wall of the rim of the loading hole 132 of the top plate 130, whereby the detergent box 210 is fixed to the loading hole 132 securely.

[0059] The first and second gaskets 251 and 252 are fitted to the insertion groove of the lid frame 221 coupled to the lid 222 so as to protrude partially.

20 [0060] And, the lid frame 221 connected to the lid 222 is coupled to the topside of the detergent box 210 by the screws S to enable to open/close the topside of the detergent box 210.

[0061] In this case, once the screws S are coupled to the coupling holes (not shown in the drawing) of the lid frame 221 while the insertion protrusions 213a and 213b at the upper front and rear ends of the detergent box 210 are inserted in the coupling protrusions 223a and

223b at the lower front and rear ends of the lid frame 221, the first and second gaskets 251 and 252 seal the gap between the bottom of the lid frame 221 and the rim of the loading hole 132 as well as the detergent box 210 and the lid frame 221 are fixed to each other.

[0062] The above-constructed washing machine according to the present invention  
5 has the following advantages or effects.

[0063] First of all, when the detergent storing assembly is loaded, the gasket cuts off the gap between the lid frame and the top plate having the loading hole to prevent water on the top plate from flowing in the cabinet. Therefore, the present invention prevents various electric and electronic parts inside the cabinet from being damaged.

10 [0064] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.